SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Fit a second degree parabola to the data.

x	1929	1930	1931	1932	1933	1934	1935
f(x)	352	356	357	358	360	361	361

17. Find a real root of $x^3 + 2x^2 + 50x + 7 = 0$ using Newton-Raphson method.

18. Solve by triangularization method the following systems. $5x - 2y + z = 4$; $7x + y - 5z = 8$; $3x + 7y + 4z = 10$.

19. Find the values of y at $x = 21$ and $x = 28$ from the following data.

x	20	23	26	29
y	0.342	0.3907	0.4384	0.4848

20. From the following table estimate $e^{0.644}$ correct to 4 decimal places using Bessels's formula.

x	0.61	0.62	0.63	0.64	0.65	0.66	0.67
e^x	1.8404	1.8598	1.8776	1.8965	1.9155	1.9348	1.9542

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write the general equation of the straight line.

2. Write the error committed when we fit a parabola by the method of least square.

3. State the condition of convergence of the iterative method.

4. Write the formula for Regula-Falsi method.

5. For solving a linear system compare the Gauss Jacobi method and Gauss Seidal method.

6. State a sufficient condition for Gauss Seidal method to converge.

7. Express $x^3 + x^2 + x + 1$ in factorial polynomial.

8. Prove that $E = 1 + \Delta$.

9. Write the advantages of central difference interpolation formula.

10. Write Stirling's formula for the central difference.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) From the table given below, find the best values of a and b in the law $y = ae^{bx}$ by the method of least squares.

x	0	5	8	12	20
$f(x)$	3	1.5	1	0.55	0.18

Or

(b) Fit a straight line to the data given below. Also estimate the value of $y(2.5)$.

x	0	1	2	3	4
$f(x)$	1	1.8	3.3	4.5	6.3

12. (a) Find the real root of the equation $\cos x = 3x - 1$ correct to 3 decimal places.

Or

(b) Solve for a positive root of $x^3 - 4x + 1 = 0$ by Regula-Falsi method.

13. (a) Solve the system of equations by Gauss Jordan method. $2x + 3y + 3z = 10$; $x + 2y + z = 3$; $3x - y + 2z = 13$.

Or

(b) Solve the following system of equations by using the Gauss-Seidal method correct to 3 decimal places. $10x - 5y - 2z = 3$; $4x - 10y + 3z = -3$; $x + 6y + 10z = -3$.

14. (a) Find $\Delta^3 f(x)$ if $f(x) = (3x+1)(3x+4)(3x+7) \ldots (3x+19)$.

Or

(b) Find the 7th term of the sequence 2, 9, 28, 65, 126, 217 and also find the general term.

15. (a) Apply Gauss's forward central difference formula and estimate $f(32)$ from the following table:

x	25	30	35	40
$f(x)$	0.2707	0.3027	0.3386	0.3794

Or

(b) Using Stirling's formula, estimate $f(12)$ from the following table.

x	5	10	15	20
$f(x)$	54.14	60.54	67.72	75.88